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FISHING INFORMATION

JANUARY 1980, No. 1

EDITOR: JAMES A. RENNER

I. Barrett, Director, SOUTHWEST FISHERIES CENTER
J. Carr, Deputy Director

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at $2^{o}F$ ($1^{o}C$) intervals) from Baja California to Vancouver Island out to about $135^{o}W$. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

Submitted for publication - February 29, 1980

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15-day Supplement)

TECHNICAL EDITOR:
R. Allen

CARTOGRAPHY:
R. Allen, H. Orr

Acknowledgements

The following organizations and stations contributed data for January 1980 charts:

Inter-American Tropical Tuna Commission, La Jolla, California
Kelco Company, San Diego, California
National Oceanic and Atmospheric Administration
  National Marine Fisheries Service, La Jolla, California; Honolulu, HI
  National Weather Service, San Diego, California and Washington D.C.
  National Ocean Survey, Pacific Marine Center, Seattle, Washington

Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L. F. Giovando from observations by:
  J. Redhead at Langara Island Light;
  R. Dobinson at Cape St. James Light;
  R. W. Moe at Kains Island Light;
  M. V. Stewart at Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Maunawili* of the Matson Navigation Company. The data are processed under supervision of D. R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During January the Aleutian low pressure center is normally near 50°N, 170°W, and the eastern Pacific high pressure center at 32°N, 130°W. Surface winds and ocean mixing are more fully developed in the region where surface pressure contours (isobars) are closest between the Aleutian low and high pressure centers (Figure 1).

In January 1980 the Aleutian low pressure center was displaced 10° of latitude south of its normal position (compare Figures 1 and 2). The eastern Pacific high pressure system was weaker than normal, and the center was displaced about 300 nautical miles southeast of its normal position. Nearly all of the Central Pacific from 30°N to 50°N and west of 135°W was dominated by low pressure as much as 8 to 10 millibars below normal. As a result of the southward displacement of the Aleutian low, the greatest ocean mixing by strong surface winds occurred from 25°N to 30°N and north of 40°N west of 145°W. The low pressure trough deepened during December and many storms developed in the Central Pacific. Strong winds, heavy seas, and rough weather fronts moved across the Hawaiian Islands and along the coast north of central California. This condition also persisted in January as the low pressure system became the dominant system in the Central Pacific.

Sea surface temperatures (SST) in the eastern Pacific reflected no organized surface frontal structure (Figure 3), partly because of the frequent and rapid changes in weather systems in the low pressure trough. The elongated area of SSTs more than 1°C below normal west of 145°W (Figure 5) moved southward from the December 1979 position. The more southerly position of the largest negative SST departures was due to the southward shift in the Pacific low pressure system, and the extensive storm activity that developed along the southern and eastern periphery of the low. The Hawaiian Islands experienced very heavy rains and gale force winds as storm centers frequently passed north of the Islands. Surrounding the negative SST departures were large areas of positive SST departures. East of 140°W and south of 25°N, the region covered by positive SST departures of 1 to 2°C was the most extensive in the 20 years that Fishing Information has been published. The above normal SSTs expanded rapidly during January under a weak high pressure system which was displaced southeast of its normal position (Figure 2). Persistent southerly winds between 130°W and 145°W was also a contributing factor to the northward expansion of above normal SSTs. The very large reservoir of above normal SSTs off the southern California and Baja California coasts will provide considerable amounts of latent heat for the intensification of storms for the late winter and spring months. The patterns of positive and negative SST differences between Januarys of 1979 and 1980 (Figure 7) were similar to the patterns of departures from normal. However, the region covered by negative SST differences more than 1°C was large north of 35°N because of the persistent high pressure system and above normal SSTs that persisted south of the Gulf of Alaska during the winter of 1979.

Western North Pacific

During January the western Pacific high pressure system was very weak east of 140°E, and the north Pacific low pressure system extended from Kamchatka to 30°N. The north Pacific (Aleutian) low system shifted southward approximately 10° of latitude across the entire Pacific in January.

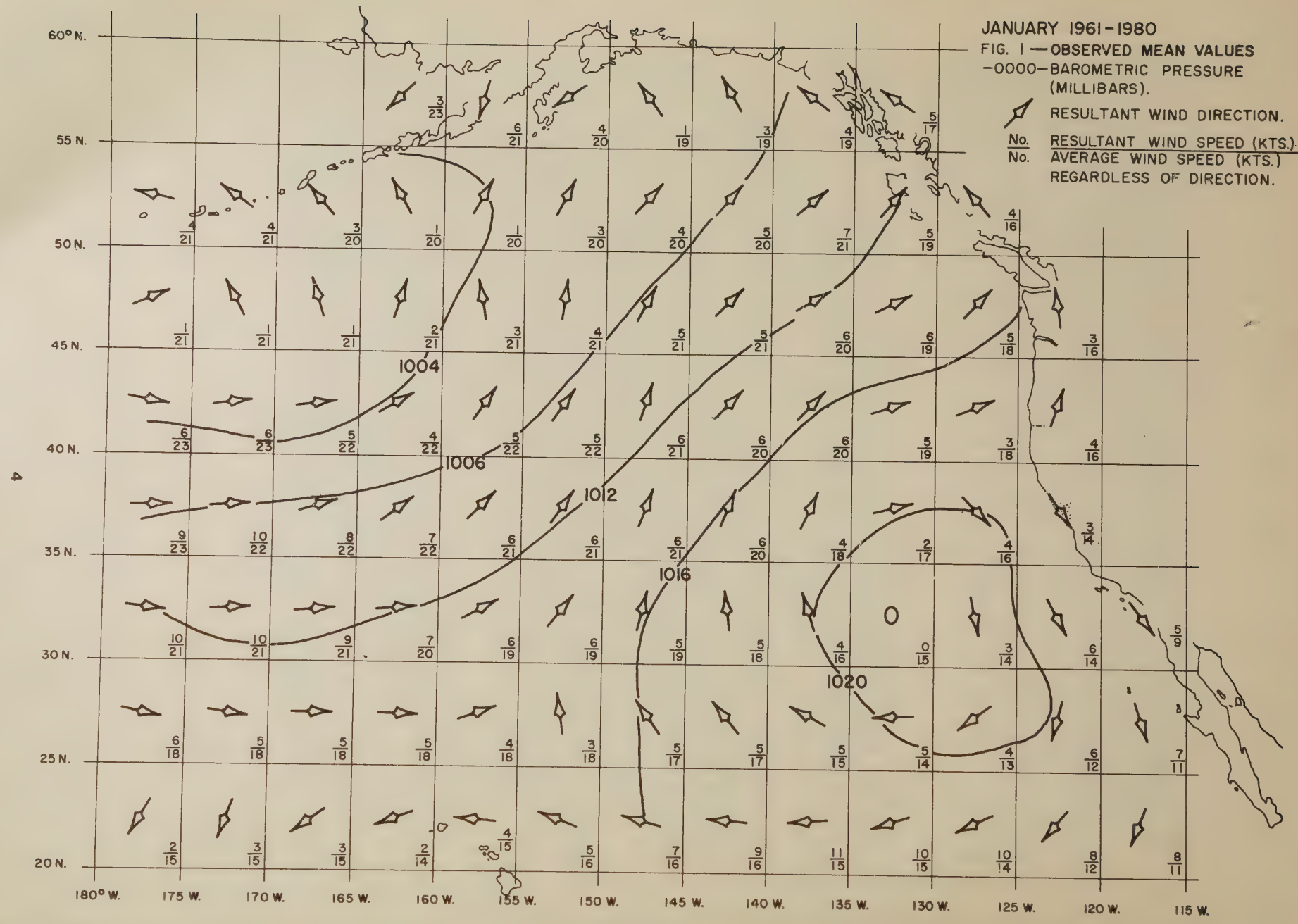
Because new low pressure centers and associated storms frequently formed east of the northern islands of Japan, an unusual pattern of above normal SSTs developed (Figure 6). The north Pacific Ocean front was split into two branches on either side of 40°N east of Japan (Figure 4) due, in part, to the breakdown of the high pressure system and the dominance of low pressure areas with lighter winds from 40°N to 50°N. Off Japan, low centers formed and moved rapidly eastward leaving behind confused surface wind patterns with less than normal ocean wind mixing. Along the east coast of Honshu, Japan northerly winds prevailed and negative SST's departures developed over the Kuroshio Current. The positive SST departures shifted northward where surface wind mixing was frequently weak under the low centers. The only significant area of SSTs more than 1°C below normal remained from December 1979 south of 35°N and east of 150°E. In this area ocean wind mixing was greater than normal due to the low latitude westerlies and weather systems that moved eastward south of 40°N.

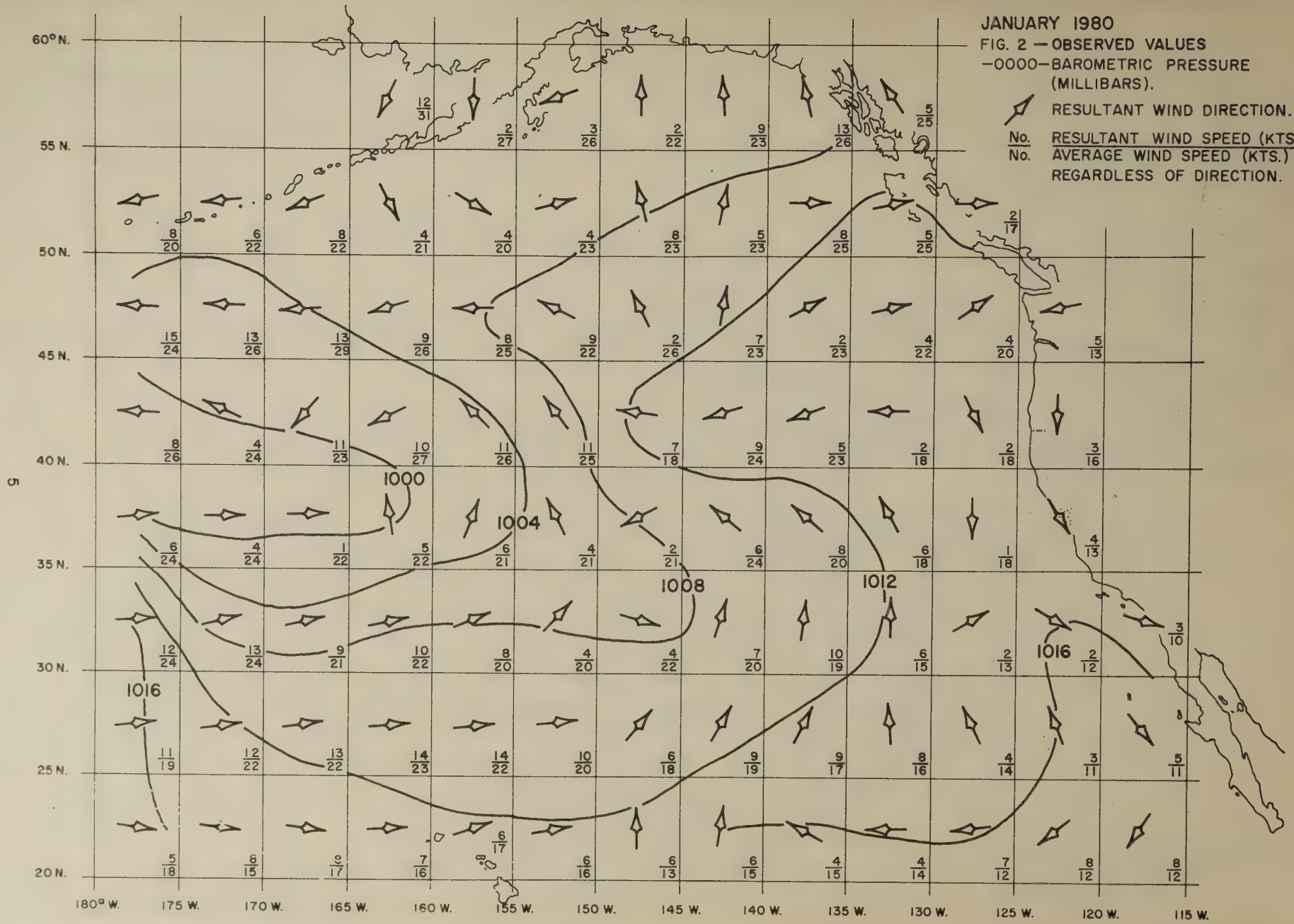
Eastern Tropical Pacific

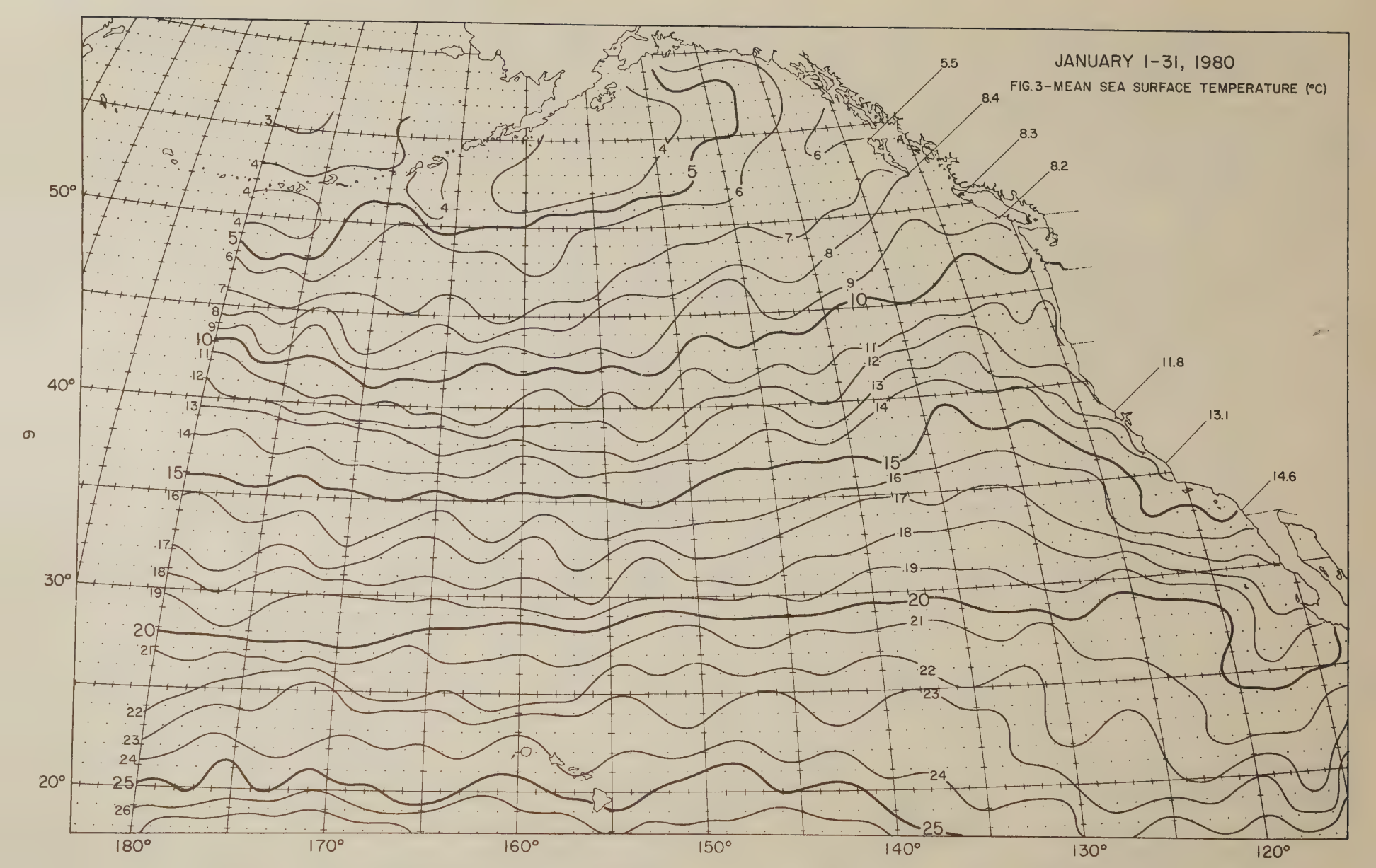
During January seasonal cooling rates of 1 to 2°C normally occur along the west coasts of Baja California and Mexico north of 18°N. Over the remainder of the tropics north of the equator SSTs decrease less than 1°C. In the southern hemisphere, seasonal warming is 1 to 2°C in the Peru Current and over the region of equatorial upwelling from 5°N to 5°S. The equatorial ocean front, which normally lies along the equator between the Galapagos Islands and Ecuador, is weaker in January and February than in any other month.

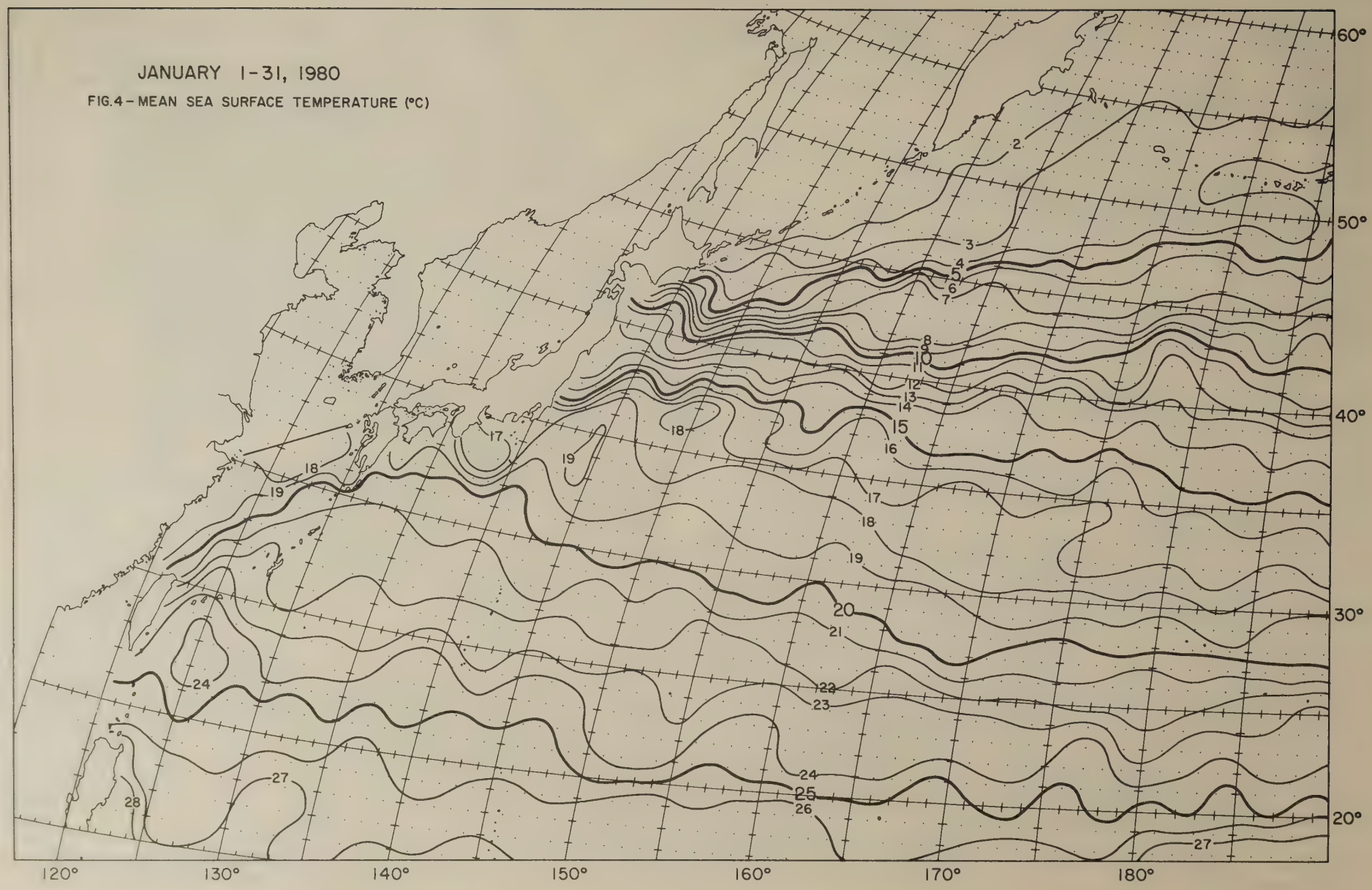
During January 1980, the SST pattern (Figure 8) in the northern hemisphere reflected weaker than normal ocean frontal structure off Baja California and in the equatorial area. South of Baja, SSTs were more than 1°C below normal due to the southeastward displacement of the eastern Pacific high pressure center which probably caused the cooler California Current water to be transported further south than usual (Figure 9). Most of the tropical region of the northern hemisphere had above normal SSTs west of 110°W because of the weak Pacific high pressure system and below normal northeast trade winds, especially between Baja California and Hawaii where SSTs were 1 to 2°C above normal. This represented one of the most extensive reservoirs of additional heat energy available for Pacific storms during the past 20 years. East of 110°W, SSTs were more than 1°C above normal over a large area south of 5°N in association with warm tropical water under light surface winds and frequently clear skies. The intertropical convergence zone, which normally lies near 5°N in January, has produced less than normal squally weather and heavy cloud cover. Also, there was a lower frequency of strong winds crossing Mexico and Central America from the Gulf of Mexico and Caribbean Sea. One result was less wind mixing at the ocean surface and less than normal seasonal cooling.

The southern hemisphere has experienced above normal SSTs east of 140°W for many months. Although the seasonal warming has been greater than normal, there was no marked warming trend in January south of the equator. However, if the southern hemisphere high pressure center (normally near 30°S, 90°W) continues to change frequently in its location and remain weaker than normal, greater amounts of warm tropical water may invade the coastal regions of Ecuador and Peru as the southern winter approaches. If above normal SSTs remain along the equator east of 100°W and along the coast of Ecuador and northern Peru for the next 3 months, and the southern high remains weak, another El Niño can be expected to set in after June 1980. The only area of significant colder than normal SSTs has been south of 15°S and west of 140°W where storm fronts in the westerlies have extended northward into the tropics with heavy cloud cover and strong winds.


JANUARY 1961-1980
FIG. 1 — OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1006
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.


JANUARY 1980
FIG. 2 — OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. / No. RESULTANT WIND SPEED (KTS.) / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.
1000
1004
1008
1012
1016
1016


JANUARY 1-31, 1980
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°C)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
5.5
8.4
8.3
8.2
11.8
13.1
14.6


JANUARY 1-31, 1980
FIG.4 - MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
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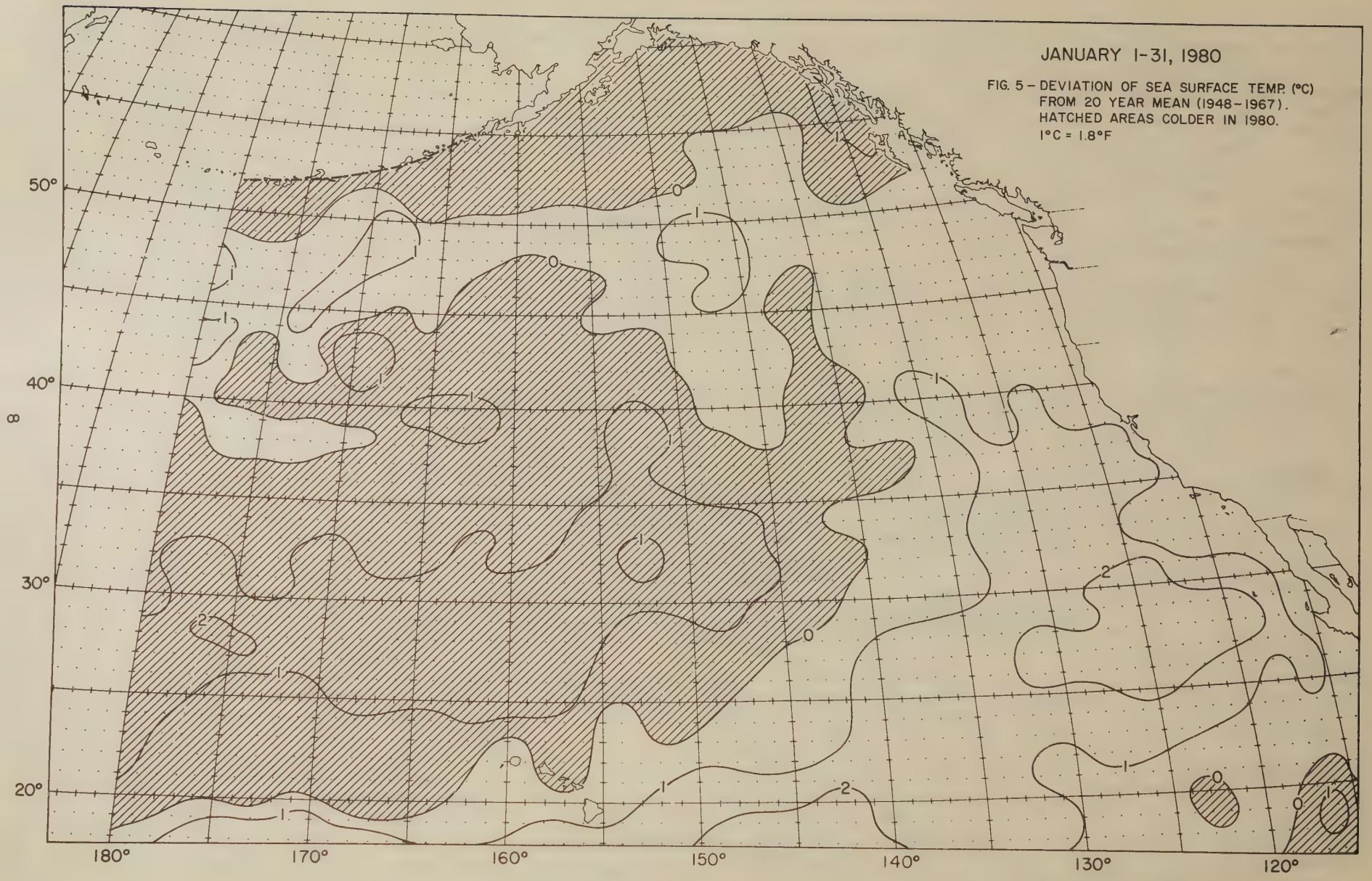
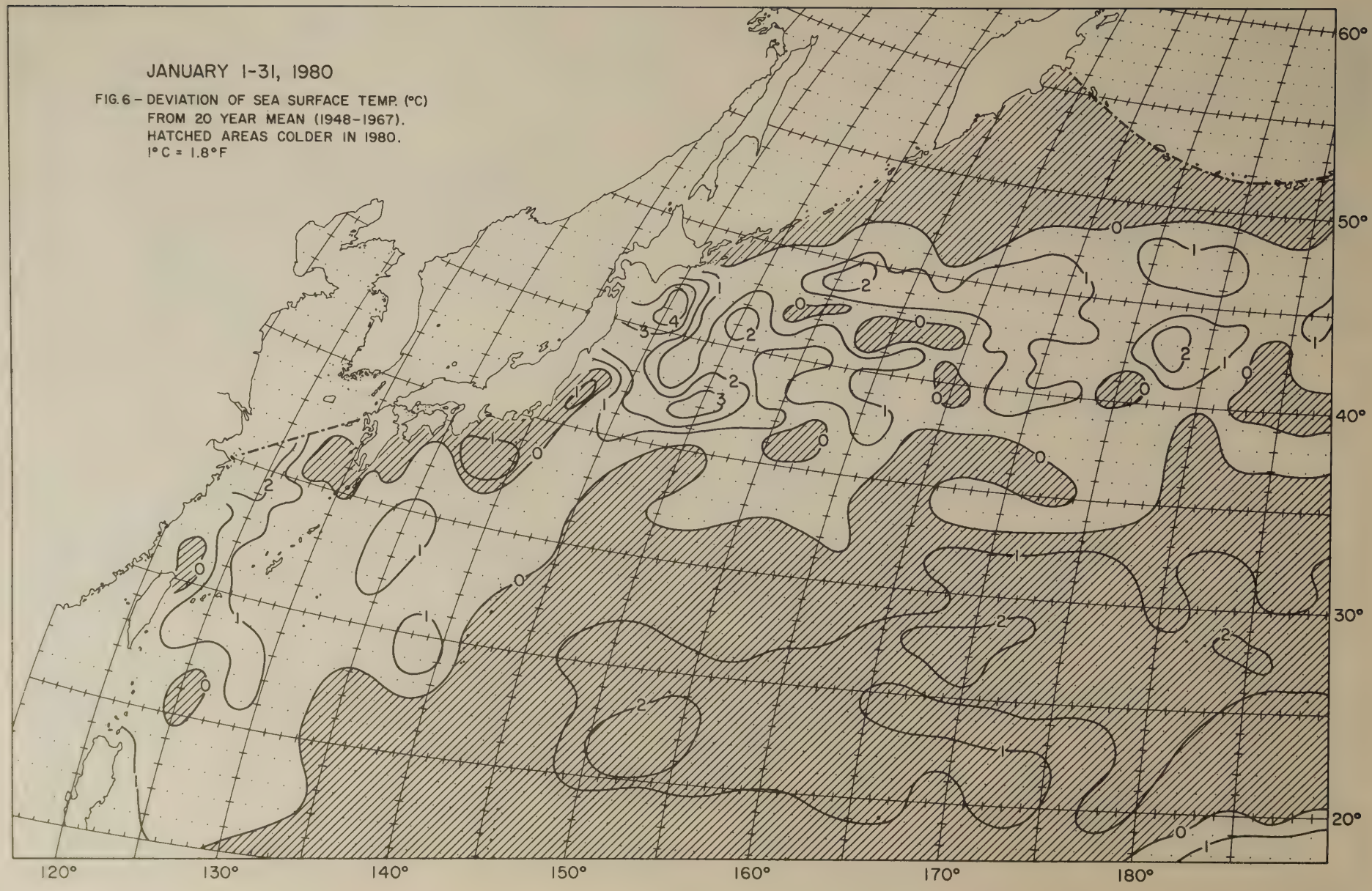
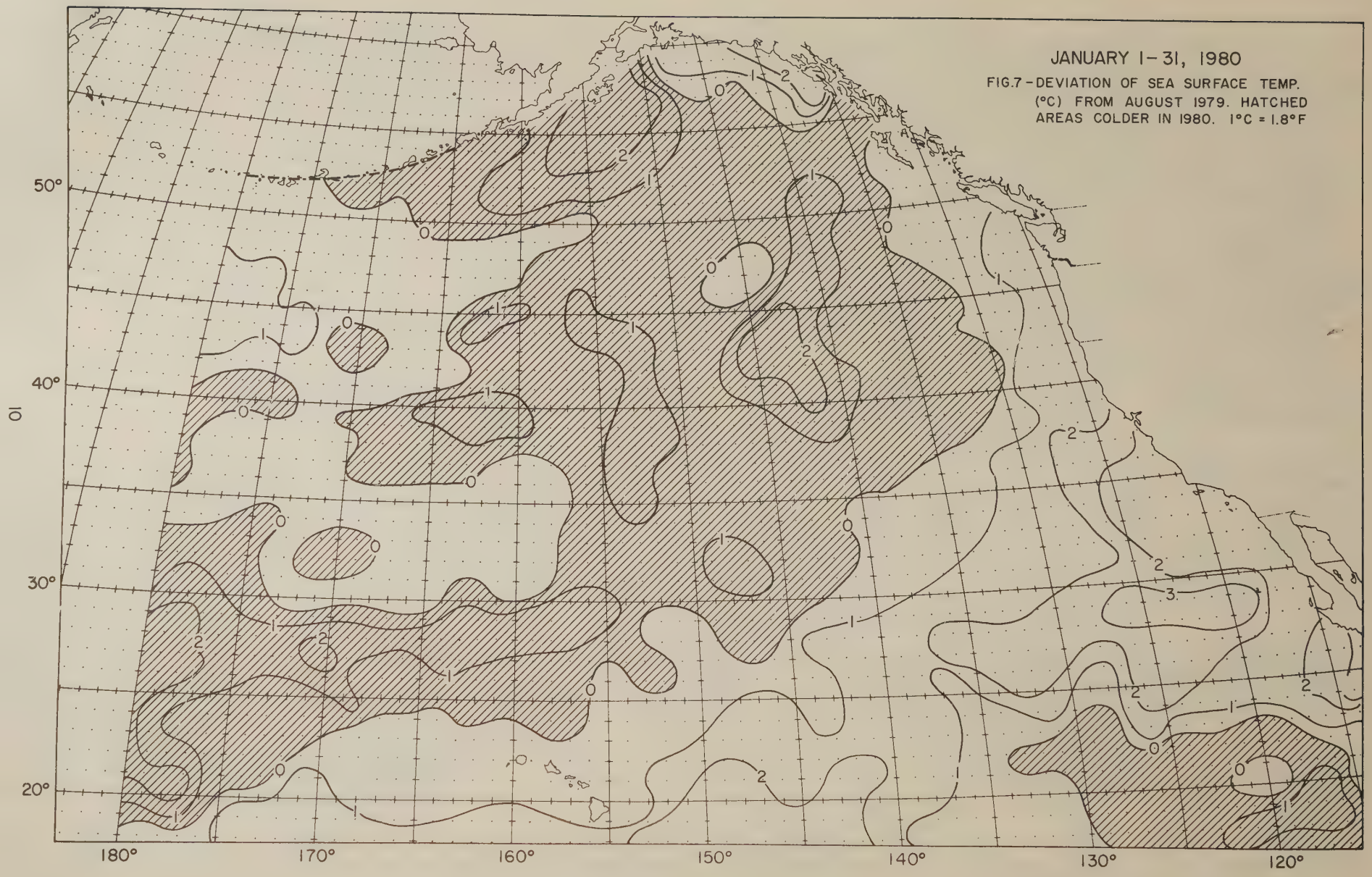
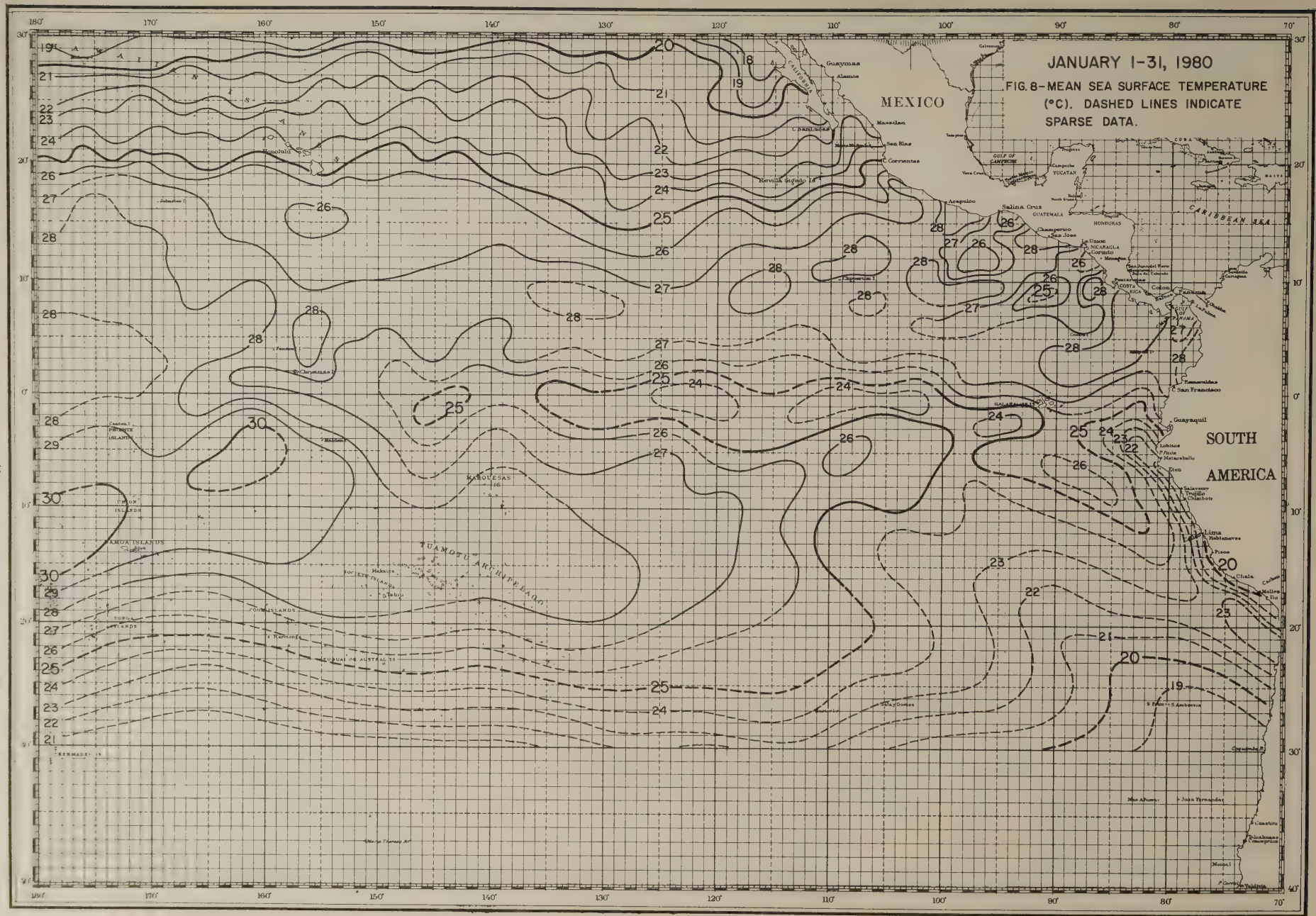
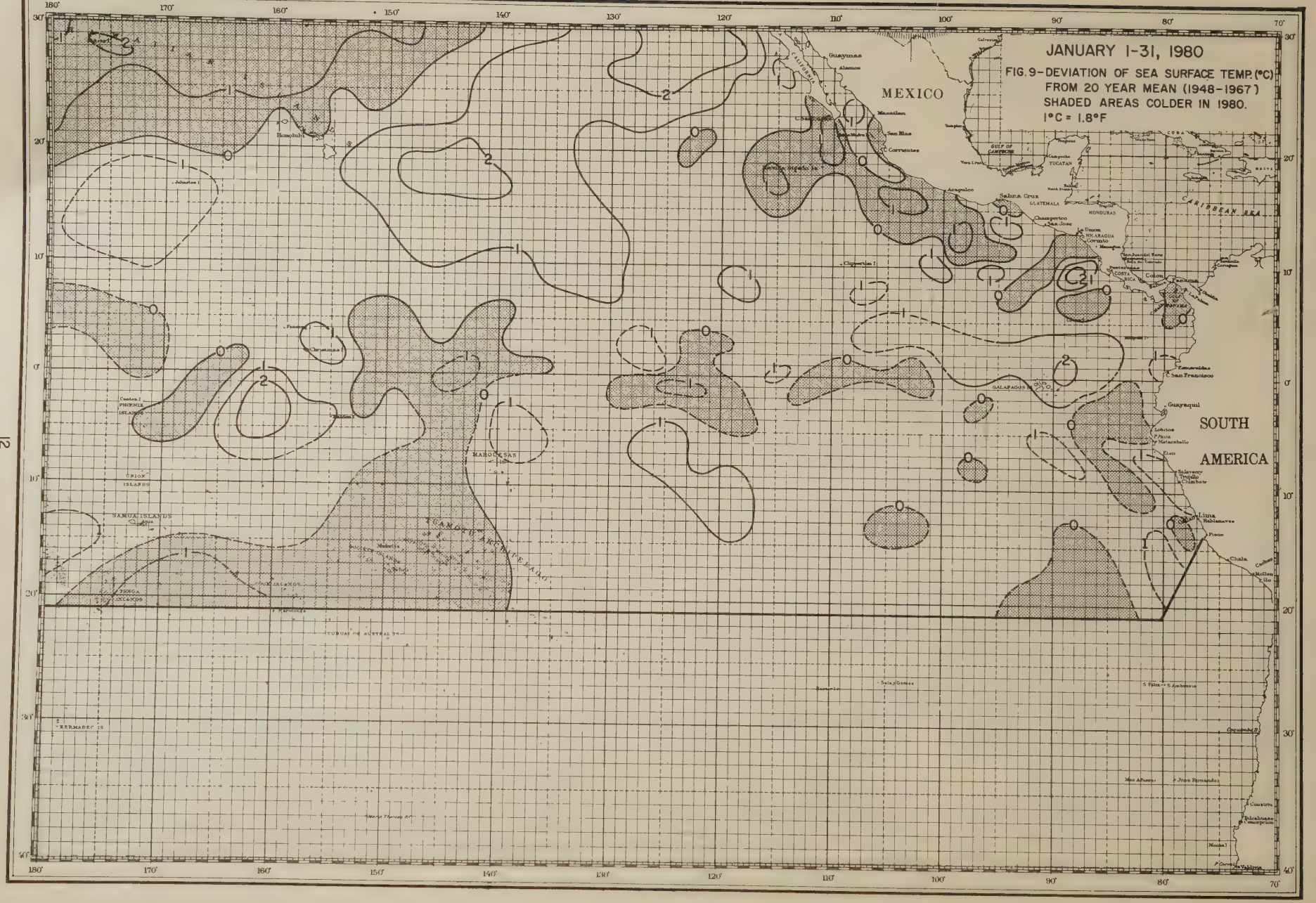

JANUARY 1-31, 1980
FIG. 5 – DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948–1967). HATCHED AREAS COLDER IN 1980.
1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


JANUARY 1-31, 1980
FIG. 6 – DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948–1967). HATCHED AREAS COLDER IN 1980. 1° C = 1.8° F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


JANUARY 1-31, 1980
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°C) FROM AUGUST 1979. HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
01


JANUARY 1-31, 1980
FIG. 8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
Panama
Colon
Guayaquil
Lima
Callao
Chala
Salaverry
Trujillo
Chimbote
Pisco
Acapulco
Salina Cruz
Manzanillo
Guaymas
Mazatlan
San Blas
Corrientes
Champerico
San Jose
Corinto
Esmeraldas
San Francisco
Lobitos
Talara
Zorritos
Mollendo
Iquique
Arica
Antofagasta
Coquimbo
Valparaiso
Juan Fernandez
San Ambrosio
MARQUESAS
TUAMOTU ARCHIPELAGO
SOCIETY ISLANDS
Tahiti
COOK ISLANDS
SAMOA ISLANDS
PHOENIX ISLANDS
LINE ISLANDS
KERMADEC IS.
Honolulu
Hawaiian Is.
Revilla Gigedo Is.
Galapagos Is.
Cocos I.
Malpelo I.
Gorgona I.
Gallo I.
Chincha Is.
Lobos de Afuera I.
Lobos de Tierra I.
Macara I.
Tumbes
Paita
Pta. Aguja
Pta. Malabrigo
Pta. Chao
Pta. Salinas
Pta. Santa Elena
Pta. Manglaralto
Pta. Pariñas
Pta. Aguja
Pta. Parapeto
Pta. Lomas
Pta. Atico
Pta. Chala
Pta. Nazca
Pta. Caballas
Pta. Morro Sama
Pta. Coles
Pta. Patillos
Pta. Lobos
Pta. Tetas
Pta. Angamos
Pta. Gorda
Pta. Pichalo
Pta. Pichidangui
Pta. Curaumilla
Pta. Lengua de Vaca
Pta. Tortuga
Pta. Tumbes
Pta. Aguja
Pta. Malabrigo
Pta. Chao
Pta. Salinas
Pta. Santa Elena
Pta. Manglaralto
Pta. Pariñas
Pta. Aguja
Pta. Parapeto
Pta. Lomas
Pta. Atico
Pta. Chala
Pta. Nazca
Pta. Caballas
Pta. Morro Sama
Pta. Coles
Pta. Patillos
Pta. Lobos
Pta. Tetas
Pta. Angamos
Pta. Gorda
Pta. Pichalo
Pta. Pichidangui
Pta. Curaumilla
Pta. Lengua de Vaca
Pta. Tortuga


JANUARY 1-31, 1980
FIG. 9 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1980.
1°C = 1.8°F
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CALIFORNIA
GULF OF CAMPECHE
YUCATAN
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
GALAPAGOS IS.
PHOENIX ISLANDS
SAMOA ISLANDS
TONGA ISLANDS
CHRISTMAS I.
MARQUESAS IS.
TUAMOTU ARCHIPELAGO
TUBUAI OR AUSTRAL IS.
EASTER I.
JUAN FERNANDEZ
Guaymas
Alamos
Mazatlan
San Blas
C. Corrientes
Acapulco
Salina Cruz
Champerico
San Jose
Corinto
Balboa
Colon
Esmeraldas
San Francisco
Guayaquil
Lobitos
Salaverry
Trujillo
Chimbote
Lima
Callao
Pisco
Chala
Mollendo
Arica
Iquique
Antofagasta
Coquimbo
Valparaiso
Concepcion
Talcahuano
Corral
Honolulu
Johnston I.
Palmyra
Christmas I.
Canton I.
Enderbury I.
Samoa
Apia
Nukualofa
Raoul I.
Macquarie I.
Auckland Is.
Campbell I.
Antipodes Is.
Chesterfield Is.
Clipperton I.
Malpelo I.
Cocos I.
Malpelo I.
Gorgona I.
Gorgona
Malpelo
Juan Fernandez
Mas Afuera
Mas a Tierra
Sala y Gomez
Easter I.
Henderson I.
Oeno I.
Ducie I.
Pitcairn I.
Gambier Is.
Tubuai
Austral Is.
Raivavae
Rapa
Marotiri
Tuamotu Archipelago
Society Is.
Tahiti
Moorea
Raiatea
Tahaa
Bora Bora
Huahine
Maupiti
Manuae
Scilly I.
Bellingshausen I.
Macquarie I.
Auckland Is.
Campbell I.
Antipodes Is.
Bounty Is.
Chatham Is.
Kermadec Is.
Raoul I.
Nukualofa
Tonga Islands
Samoa Islands
Apia
Manihiki
Rakahanga
Penrhyn
Pukapuka
Nassau I.
Suwarrow
Palmerston I.
Aitutaki
Rarotonga
Mangaia

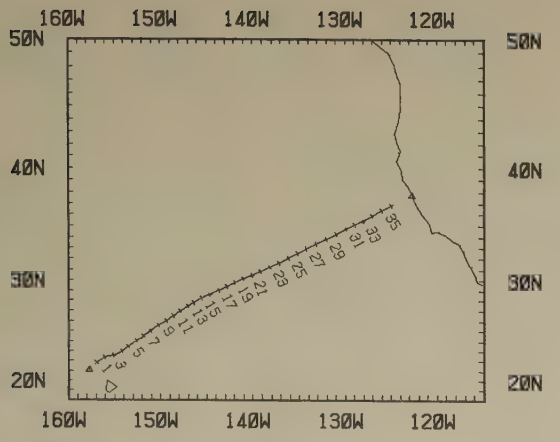


FIGURE 10

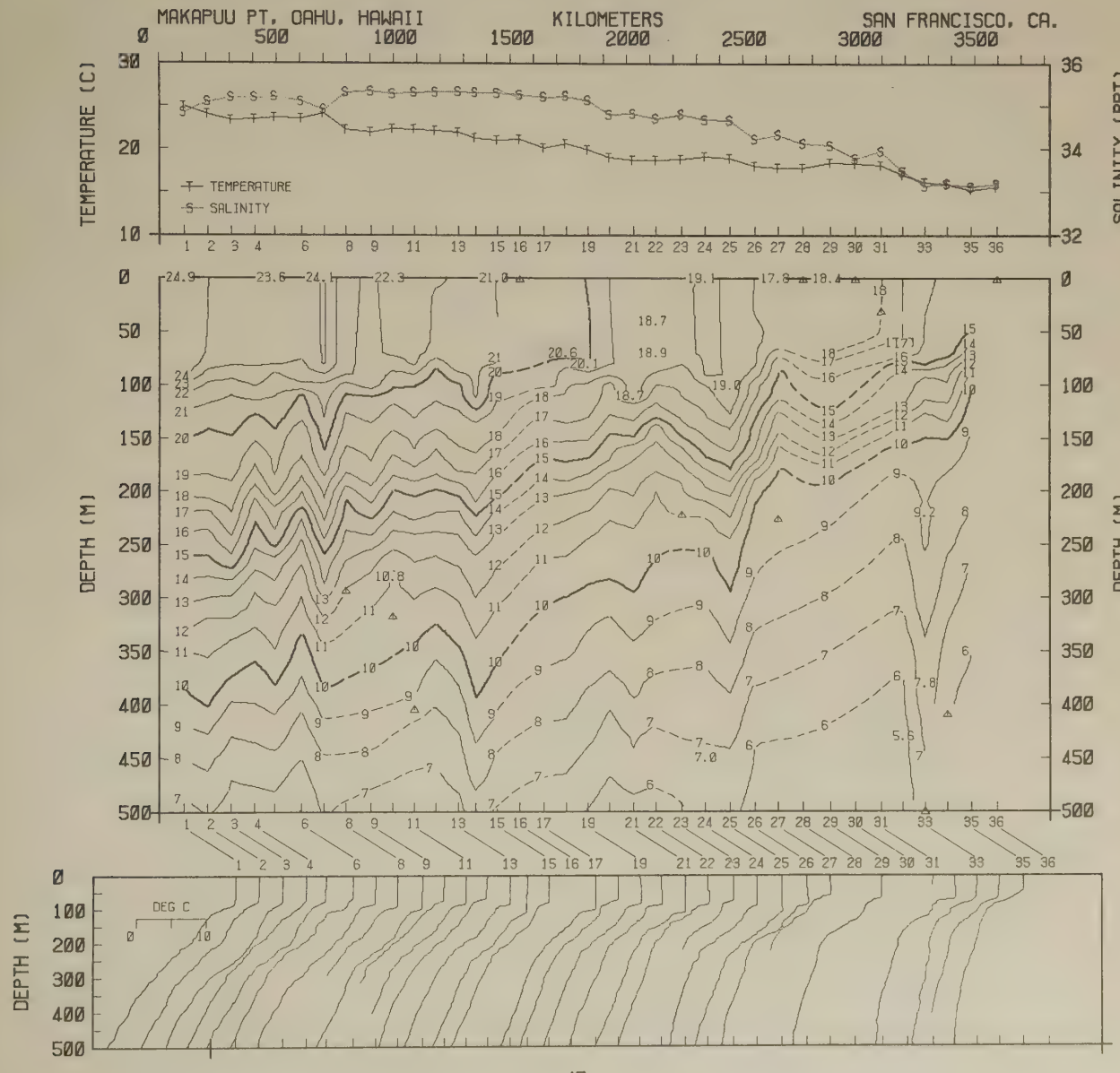
SHIP MAUNAWILI

VOYAGE 262E

MAKAPUU PT, OAHU, HAWAII
- SAN FRANCISCO, CA.

01 JAN 1980 - 08 JAN 1980

NOAA-NMFS PEG MONTEREY, CA.



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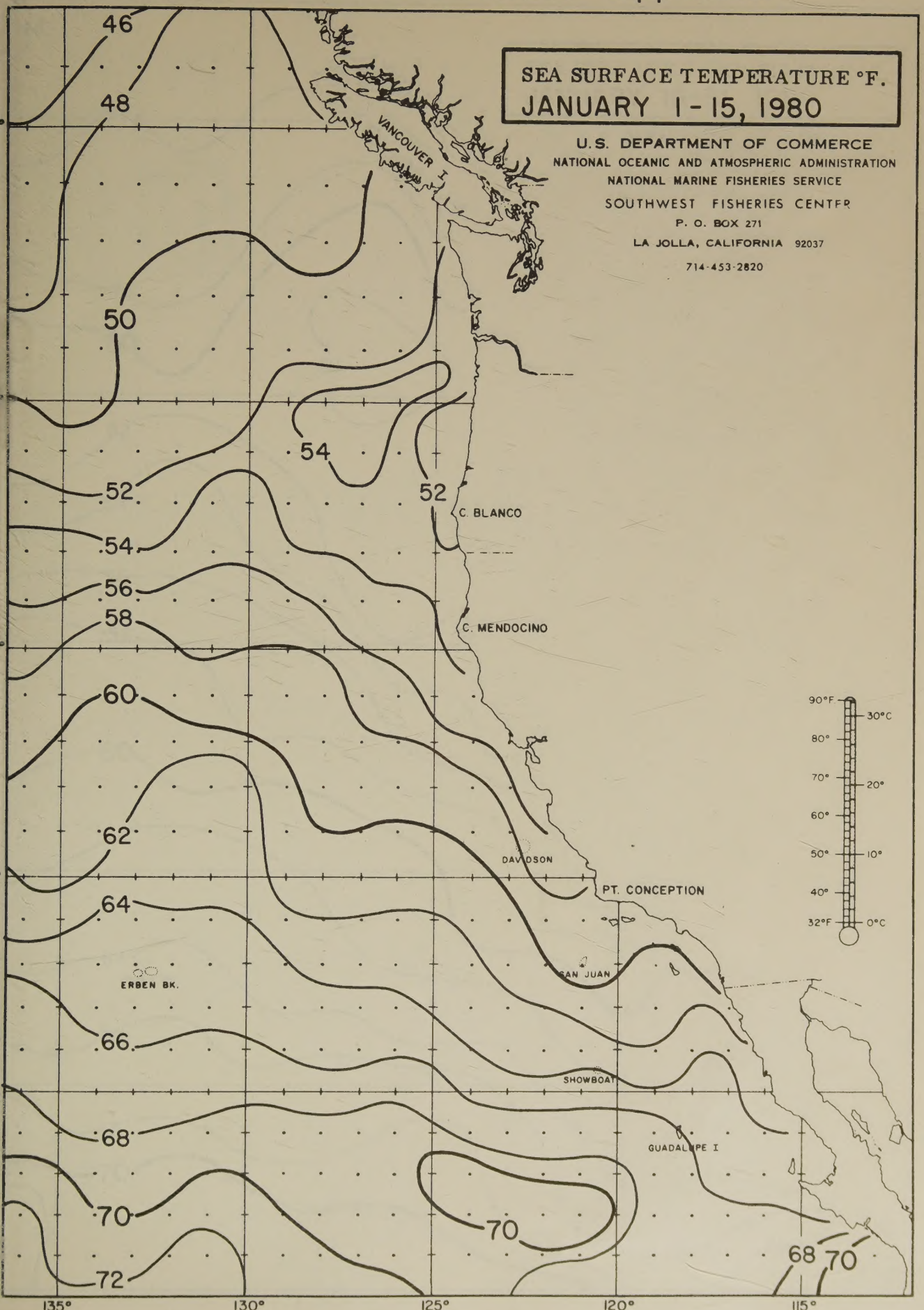

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